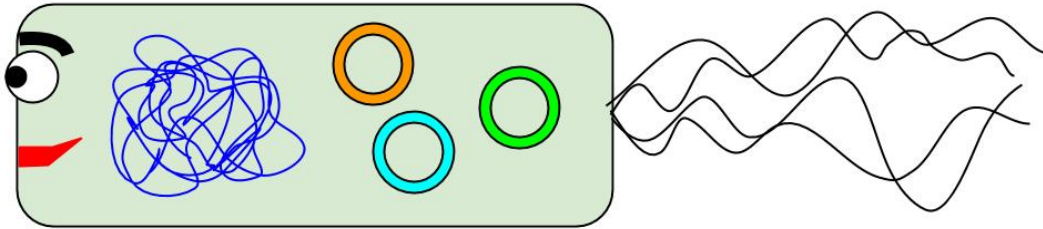


Activity 2: Clone your DNA into bacteria!

Cloning is the process of reproducing a piece of DNA which contains a gene that you would like to amplify and use in a variety of other applications. One of these applications is synthetic biology or genetic engineering. It is the process of making an organism that has properties unseen in the species in the nature.

In other words, we want the organism to **do what we want**, to **be what we want** and **make what we want**. You can also say that we are hijacking the organism's machinery to do what we want. So we are pretty selfish and the organism, such as bacteria is very hard working!

We like to use the bacteria *E. coli*, because it is safe, easy to use, easy to manipulate and grows very fast. *E.coli* is originally a gut organism, found in the intestine of many mammals, including humans, but it is also a very useful lab organism. Here it is:



***E. coli*:** “I have chromosomes which contain DNA to carry out all the functions I need to do like eating food and making energy!”

“Also, I’ve got little circular DNA which contain few genes and can be easily manipulated. By manipulation, I mean that you can easily add or remove a gene and easily transfer it into me.”

“By putting the gene for making fluorescence into one of these circular DNAs, you can make me emit light and give out pretty colours after putting the circular DNA into me.”

“You can also put so many other genes in to make or do all kinds of stuff!”

Random Guy: “Can you explain why they are using you in iGEM?”

***E. coli*:** “They are using my circular DNAs to put a gene into it that will enable me to make chemical compounds for them which are traditionally very hard to make.

They are trying to make a compound which can be used in making anti-HIV drugs as the compound is very expensive and hard to make. (HIV is a deadly virus which currently infects millions of people, and is difficult to treat)

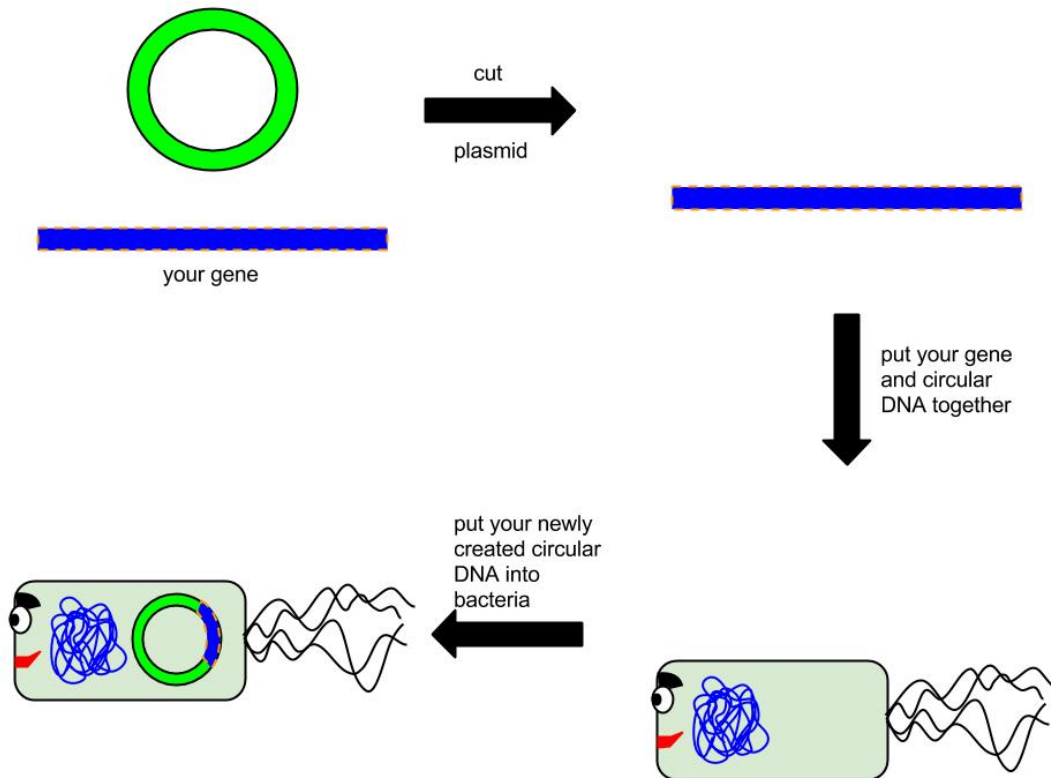
Sydney iGEM 2015 Outreach Worksheet

So by making that, they are using the power of biology to cure many HIV patients by making the drug cheaper and more accessible. How cool is that?!"

Random Guy: "Can you show everyone else how you can do that?"

E. coli: "First, you cut the circular DNAs and put the gene (in a piece of DNA) you want into it. Then, put the newly created circular DNA containing your gene into me. I will then do all the hard work for you. You're welcome!"

Now, you can fill in this worksheet on how we do cloning:



After cloning, then the bacteria can make the chemical for you!

